VIRGINIA'S NATIVE PLANTS

Native plants are one of the Commonwealth's greatest natural resources with thousands of plant species native to Virginia, as well as various mosses and lichens. They also are part of our natural resource heritage in Virginia. They provide the basis for much of our habitats and ecological communities throughout the state, serve as valuable tools to understand the natural world, and have intrinsic values as part of an ecosystem. A diversity of native plants ensures a high diversity of other organisms that use plants communities for their food, shelter, and nesting because plants are the basis of many of our food webs.

Overview

What is a native plant?

Put simply, a native plant is one that occurs naturally (i.e. not planted or brought by humans) in a given area. More refined definitions are provided by state, federal, and international organizations.

Figure 1. Sumac seed head. Provides winter food for birds and mammals. Photo by Emily Ford.

The non-profit organization Wild Ones describes a native plant species as… "one that occurs naturally in a particular region, ecosystem and/or habitat and was present prior to European settlement."

The National Park Service provides this description: "Native species are defined as all species that have occurred or now occur as a result of natural processes on lands designated as units of the national park system. Native species in a place are evolving in concert with each other."

Virginia's Department of Conservation and Recreation: "Native species are those that occur in the region in which they evolved. Plants evolve over geologic time in response to physical and biotic processes characteristic of a region: the climate, soils, timing of rainfall, drought, and frost; and interactions with the other species inhabiting the local community. Thus native plants possess certain traits that make them uniquely adapted to local conditions, providing a practical and ecologically valuable alternative for landscaping, conservation and restoration projects, and as livestock forage. In addition, native plants can match the finest cultivated plants in beauty, while often surpassing non-natives in ruggedness and resistance to drought, insects and disease."

Why learn about Virginia native plants? Why teach about Virginia Native plants?

Figure 2. Prickly Pear cactus Opuntia humifusa. Photo by Emily Ford.

The diversity of native plants in Virginia offers a rich opportunity to integrate subjects (science, English, social science, fine arts, and more) in an engaging way. Native plants provide insight into cultural and historical heritage and opportunities to examine organism and ecosystem diversity in a healthy functioning system.

Virginia's remarkably diverse and unique assemblage is due to the state's variety of habitats, assorted geology, and physiographic differences which are divided into five distinct regions. Some of our plants have very specific life needs and can only grow under certain conditions, while others can thrive in a variety of habitats and communities. For example, the carnivorous sundew plants survive in nutrient-poor bogs where other plants would perish because they have evolved sticky hairs to capture insects. The American mountain ash is rarely found at elevations below 3000 feet; it has evolved to live at higher elevations with poor, rocky soil. Many environmental factors (geology, soil type, slope of the land, and existing plants) determine what native plants can survive or thrive in a particular habitat.

Figure 3. Round-leaved Sundew Drosera rotundifolia. Photo by Gary Fleming.

Virginia's native plants range from ubiquitous species found statewide, [Chestnut Oak (*Quercus montana*), Red Oak (*Quercus rubra*), Virginia creeper (*Parthenocissus quinquefolia*) or Common wood sorrel (*Oxalis stricta*)] to some plants that are found only in a few counties! These plants are explored later in this chapter.

Virginia Science SOL Strand Connections

Earth Resources

K.11, 1.8, 2.8, 3.10, 3.11, 4.9, 6.5, 6.9, ES.11

Moss, or bryophytes, are abundant throughout our state. When compared to flowering plants, little is known about their preferred habitats and ecosystems functions. Efforts are currently underway in Virginia to include mosses in the Digital Atlas of Virginia Flora: http://vaplantatlas.org/news/. Mosses lend themselves to classroom learning well. They are easy to keep in the classroom, provide opportunities to study ecosystems on a small scale, and they are "cute"!

There are many ways to explore Virginia native plant species and their distributions. We can investigate geographic provinces, communities and habitat, elevation, plant shape or form, etc. Read on to learn about plants from the five physiographic regions of Virginia.

Physiographic Regions

Virginia has five geographic regions or physiographic provinces. Each of these regions has distinctive geology with a variety of soil types, temperature ranges, precipitation amounts, and soil moisture levels. Rainfall and temperature can vary across a geographic region, leading to a diversity of plants in areas. Some native plants are restricted to a certain region while others can thrive in all the regions. Some plants are adapted to live in brackish or salty water; thus they will only be found in the coastal plain and would never thrive in the Appalachian plateau.

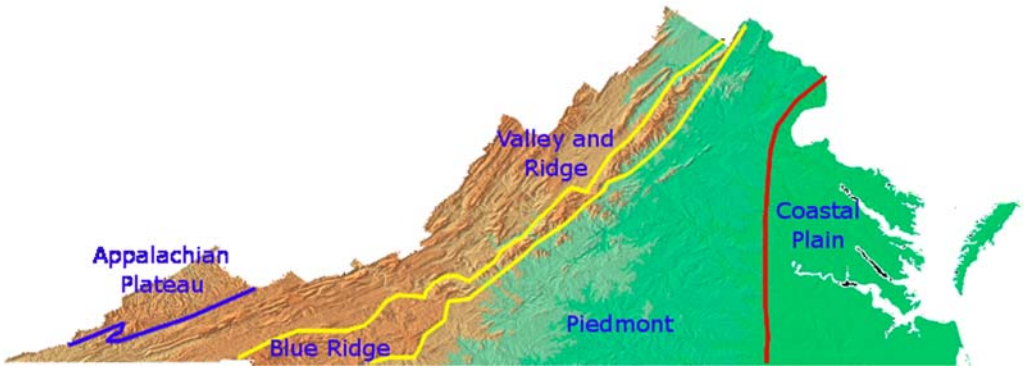

Figure 4. Virginia's Physiographic Regions http://www.virginiaplaces.org/regions/physio.html

Appalachian Plateau

Our westernmost region is the Appalachian plateau, a large, raised plain of eroded sedimentary rock. The elevation ranges from 2000 feet to about 4000 feet on ridge tops. The geology consists of sedimentary rocks, including coal. The majority of this area is forested (80%); oak and oak-hickory dominate the forests. In the Allegheny section of the plateau, Highland County is home to many species endemic to just the county [Drooping woodreed (*Cinna latifolia)* and Bog Goldenrod *(Solidago uliginosa*)]. The Cumberland section of the plateau holds more acidic soil and thus, acidic forests of oak and heath plants. Chestnut oaks, mountain laurels, and various blueberry species dominate these forests.

Endemic-

- (of a plant or animal) native or restricted to a certain country or area

Valley and Ridge

Part of the Appalachian mountain system, the Valley and Ridge province includes the Great Valley of Virginia and other valleys which are separated by ridges. It covers about 25% of Virginia's land area with 60% of the region in forest. The forests are dominated by a mixture of oak species [Chestnut oak (*Quercus montana),* Scarlet oak *(Q. coccinea),* black oak *(Q. velutina),* white oak *(Q. alba*)] with a smattering of fire tolerant pines. An interesting portion of this regions is the shale barrens where a unique collection of plants have evolved to survive, and even thrive, in the less fertile, nutrient-poor soil. The Salt marsh bulrush (*Bolboschoenus robustus*), common on the coastal plain, is found

A **shale barren** is an open community (no shade) found on steep south or southwest facing slopes. The habitat is dry, with poor vegetation and bare rock.

Figure 5. Fritillary on Butterfly weed. Photo by Emily Ford.

in only one county (Smyth) in this region. This plant is able to survive in this area due to basins that are flooded by groundwater from Mississippian salt deposits.

Blue Ridge

The Blue Ridge province, also part of the Appalachian mountain system, is composed of rounded mountains. The headwaters of many streams and rivers originate in this region. It covers about 11% of the state with roughly 75% of the region forested. The deciduous hardwood forests of this region are dominated by red and white oaks. In the southern section of this province, yellow buckeye (*Aesculus flava*), Fraser magnolia (*Magnolia fraseri*), and spruce (*Picea* spp.) species join the plant community. In the northern section, the oaks are accompanied by yellow birch (*Betula allegheniensis)* and northern red oak (Q. rubra).

Piedmont

The Piedmont region is composed of gentle rolling hills, has an average elevation of 850 feet, and covers the majority of Virginia (from the coastal plain Fall Line to the foot of the Blue Ridge Mountains). The deciduous hardwood forests (60% of the province) also include some loblolly (*Pinus taeda*) and other pine species. Due to its high human population density, this region has been severely altered by humans. In areas that have been allowed to return to forest (successional forests), common native plants include Virginia pine (*Pinus virginiana*) and tulip poplar (*Liriodendron tulipifera*). In more mature forests, white oaks, hickories, and maples dominate.

Virginia SOL Science Connections

Living Systems

2.5, 3.5, 3.6, 4.5, 5.5, 6.7, LS.2, LS.3, LS.4, , LS.6, LS.7, LS.8, LS.9, LS.10, LS.11, LS.12, ES.9, ES.10, BIO.3, BIO.4, BIO.5, BIO.6, BIO.8

When compared to other regions of Virginia, the Piedmont has a lower diversity due to its lack of variation in topography (found in the western regions) and wetland habitats (as in the Coastal Plain to the east). However, this region is home to a few rare species such as the Piedmont fameflower (*Phermeranthus piedmonanus)* and Piedmont quillwort (*Isoetes piedmontana).* The latter has only been found in one county (Powhatan) with only one population!

Coastal Plain

Virginia SOL History and Social Science Connections

Geography and Culture

K.7, 1.6, 2.7, 3.7, VS.2, USI.3c

Low in elevation and east of the fall line, the Coastal Plain regio covers 21% of the state, only 15% of which is forested. Loblolly pine (*Pinus taeda*) is the dominant species in these forests with the outer coastal plain containing other pine species and mixed pine/hardwood forest. In the bottomland swamps along rivers, bald cypress (*Taxodium distichum*) and species of tupelo (*Nyssa spp.)* are the dominant plants.

It is difficult to determine what the dominant plant species were in the coastal plain's upland forests as human use has significantly altered the landscape. The Coastal Plain also has the largest amount of wetlands including freshwater habitats, brackish areas, and salt marshes. Many plant species here are well adapted for these marshy environments.

Only in Virginia!

In Virginia, we have some unique and irreplaceable species.

Virginia Round leaf Birch, *Betula lenta* var. *uber*, is a small tree with a wild population found only in ONE

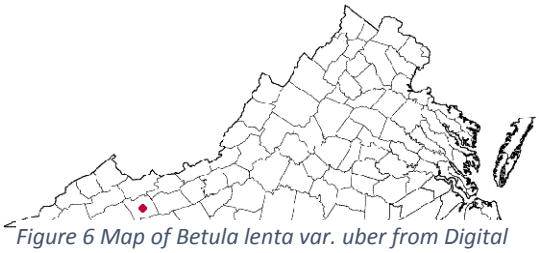

Figure 6 Map of Betula lenta var. uber from Digital Atlas of the Virginia Flora.

county in Virginia (Smyth). There is some disagreement among scientists if it is a variety of *B. lenta* or a species in its own right.

The Mattaponi Quillwort (*Isoetes mattaponica*), endemic to just four counties in the coastal plain region, grows in shallow, intertidal zones. Quillworts are a type of vascular plant related to ferns that reproduce with spores. Quillworts have long narrow leaves and are adapted for wetland areas.

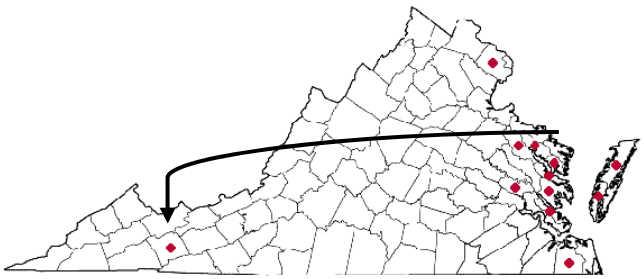

Figure 7 Map of Juncus gerardii from Digital Atlas of the Virginia Flora

Saltmarsh Rush (*Juncus gerardii),* is a species typically found in coastal areas, but a population also occurs in a rare, inland marsh in the Valley and Ridge province. This plant evolved to live in brackish (slightly salty) water. Why is it found on the coast and then in one county in the Valley and Ridge? Because of salt deposits left in this mountains from the Mississippian subperiod of the Carboniferous period!

Peter's Mountain Mallow (*Iliamna corei)*, listed on both the state and federal endangered species lists, is found on one mountain in Giles County! Efforts to conserve and protect this species have been made through the purchase of the Narrows Preserve by the Nature Conservancy of Virginia, a non-profit organization, and with the assistance of scientists and conservationists who study current populations and restore habitat critical for this plant's survival.

Plant Outliers

Due to Virginia's latitudinal position on the east coast of North America, several species of plants are at the northern edge of their range. The Carolina laurel (*Kalmia carolina*), closely related to mountain laurel, is found in a couple of counties in the Valley and Ridge and then, a few on the Coastal Plain. Further south in the U.S., this species is more common as it is optimally adapted for a warmer climate. For more information about more rare and unique Virginia native plants as well as student activities focused on the subject, visit Blandy Farm Education and DCR natural heritage webpages.

Figure 8. Buttonbush Cephalanthus occidentalis. Photo by Emily Ford.

Conserving Natives

In recent years, there has been much research focused on native plants and their influence on healthy functioning ecosystems. Interest in planting natives has increased in Virginia and around the country. Why natives? Native plants are often better suited for an area than non-natives; they are adapted for the different habitats and regions, and require less watering and care once established in a garden or wild area. As part of an ecosystem, native plants are essential food resources for native organisms such as flies, bumblebees, butterflies, and moths. Birds and other animals prey on these organisms that are feeding on native plants. For example, the native redbud tree (*Cercis canadensis*), blooms in early spring, providing nectar and pollen to native bees and other pollinators. Squirrels, bobwhite quail, and songbirds eat the seeds during the summer. Hawks prey on the small mammals and birds that eat the seed and spiders prey on the insect pollinators.

Figure 9 Early spring redbud flowers, *Cercis canadensis.* Photo by Emily Ford.

Want to explore and share Native Plants?

To engage students in investigating and exploring native plants:

- ◊ Consider using native plants in a garden area at school, if one is available.
- ◊ If not available, inquire with your school about including native plants in landscaping or visit a nearby park.
- ◊ Go Big… Create a native school garden! Many volunteer organizations (such as Virginia Native Plant Society, Virginia Master Naturalists, or Master Gardeners) may be able to offer their expertise and assistance.
- ◊ Virginia's Department of Game and Inland Fishers Habitats for Wildlife https://www.dgif.virginia.gov/wildlife/habitat/ offers tips for gardening with native plants.
- ◊ Building native plant habitats is a great way to engage students in interdisciplinary learning! Curriculum ideas can be found in the resources section. Some grant funding is available, examples are below.
    - Schoolyard Garden Grants from various organizations http://www.americainbloom.org/resources/grant-opportunities.aspx
    - Chesapeake Bay Trust http://www.cbtrust.org/site/c.miJPKXPCJnH/b.5457271/k.C58E/Grants.htm
    - National Garden Clubs http://www.gardenclub.org/awards/wildflower-awardgrants.aspx

- Some 'big box' stores offer small grants for schoolyard projects (Lowe's, Target, etc.)
- Virginia Naturally grant resource page http://www.dcr.virginia.gov/environmental-education/grants

Teaching Resources

Activities and resources to use in your teaching can be found at this web page http://www.blandy.virginia.edu/education/vanativeplants. Resources include:

- ◊ Chapter on Native Plants in the Virginia Natural Resources Education Guide
- ◊ Butterfluff- A kinesthetic activity for learning about native and invasive plants
- ◊ Chesapeake Bay Trust activities developed in partnership with Clarke County Public Schools integrating native school gardens in the classroom and outdoors
- ◊ TREE Fund Project with Clarke County Public Schools
- ◊ Conservation Challenge
- ◊ Schoolyard Botany- Lessons and activities developed by Barbara Adcock, STEM coach at Powhatan county schools and awardee of the Presidential Award for Excellence in Mathematics and Science Teaching

Art and Science Teacher Resource	Creating a Dicot Key
Creating a Nature Journal	Journaling like a Botanist
Creating Herbarium From Recyclables	Preserving Plant Specimens
Plant Uses Part One	Plant Uses Part Two
Changing Habitat	Using a Dichotomous Key
Soil Mapping	Coastal Plains and Mountain Disjunct Plants
Plant Vocabulary	Suggested Activities for an Outdoor Classroom

Have a resource of your own that you'd like to share? Contact Emily Ford at 540-837-1758 ext. 290 and emilyford@virginia.edu.

Organizations and other helpful Resources

The Virginia Native Plant Society, including member chapters local to your area

Department of Conservation and Recreation

Flora of Virginia Project

Native Plant Nurseries http://vnps.org/conservation/plant-nurseries/

For more information on Native plants http://www.dcr.virginia.gov/natural-heritage/factsheets

References

* *The Flora of Virginia* Weakley, A.S., J.C. Ludwig, and J.F. Townshend. 2012. Bland Crowder, ed. Foundation of the Flora of Virginia Project Inc., Richmond. Fort Worth: Botanical Research Institute.
* Digital Atlas of the Virginia Flora Digital Atlas of the Virginia Flora for maps and other information on Virginia native plants.
* This article discusses and adds depth to our definition of native plants. Why Natives? from VNPS.org
* Virginia's DCR Native plant definition http://www.dcr.virginia.gov/natural-heritage
* Peters Mountain Mallow http://www.dcr.virginia.gov/natural-heritage/document/fsicorei.pdf
* Piedmont Native Plants: A guide for landscapes and gardenswww.albermarle.org/nativeplants
* National Park Service definitions of native, exotic, and invasive organisms https://www.nps.gov/policy/mp/chapter4.htm
* National non-profit organization focusing on native wildflowers in yards. Wild Ones